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Mr. J. A. Bauer's Phylloxera Remedy.

As a general answer to numerous inquiries concerning the probable efficacy of the phylloxera remedy devised by Mr. J. A. Bauer, of San Francisco (viz., the introduction of finely divided quicksilver into the earth around the stock), regarding which several articles have lately appeared in the public press, the following points, based upon the known and observed habits of the insect, are here given in advance of the experiments which it is hoped will be extensively made during the coming season:

There can be no question as to the efficacy of metallic mercury finely diffused through the soil in killing the phylloxera or any other small insect remaining within its reach for any length of time. Apart from the experience long had in this respect in the means used for the preservation of various articles, insect collections, etc., from the attacks of small insect depredators, the direct experiments of Mr. Bauer on earth and roots infested with the phylloxera have been entirely conclusive as to the inability of the latter to live more than a few hours in the atmosphere created in a close space, or in earth, at the ordinary temperature, by finely divided mercury. The conclusion that a soil column of six or eight inches depth, impregnated with the mercurial vapor by intermixture with "blue mass," will effectually prevent the passage through it of the slow-going insect, is therefore fully justified. Many other substances might be used to act similarly in this respect, *e. g.*, gas lime; but none others thus far suggested possess the permanency of the mercurial preparation, and the entire innocuousness toward even the most delicate rootlets, unless perhaps in the case of the direct contact of the globules themselves. On this point certainly Mr. Bauer's inspiration has been a most happy one, and while the introduction of mercury into boreholes made in the stem of the vine has long been suggested and found to be useless, his suggestion is, so far as known, altogether new and certainly original.

Were it feasible to impregnate the entire soil of a vineyard with the mercurial preparation, the phylloxera, being unable to ascend to the surface, would probably in a few generations be compelled to succumb, as the "winged form" could not then perform its functions toward the renewal of the tribal vigor by sexual reproduction. Since, however, so extended a

use of even this very dilute insecticide is hardly practicable on the large scale, it remains to be determined to what extent its use *immediately around the trunk of the vine*, in the manner proposed by Mr. Bauer, will be likely to serve the purposes of prevention and repression.

The interposition of obstacles to the passage of the insect along the stock was among the early suggestions of aspirants to the great prize offered by the French government for the discovery of an effectual remedy. We have among the inventions aiming in that direction even a proposition to encase the stock in a plaster jacket of several inches thickness. It will be surmised that the sagacious insect was not long in discovering a convenient path outside of the lump of plaster toward the coveted roots.

In the case of Mr. Bauer's plan, however, the descending or ascending insect innocently crawls into a well-laid trap, which gives no outward sign even by an obnoxious odor. According to the experience had thus far, it seems quite likely that the unwary travelers would find themselves ensnared before they had any intimation of danger; and as there can be no doubt that the great bulk of the ingress and egress ordinarily takes place along the trunk of the vines after the egg laid by some wanderer on the leaves or branches has hatched, it can hardly be doubted that a considerable repressive influence would be exerted by Mr. Bauer's remedy even where the phylloxera already exists, and that it would also act as a fairly effectual preventive of infection for many uninfested vineyards.

Its *universal* efficacy is, however, limited by the fact that (as has been observed in Europe, and quite lately and very prominently in this State) not only the winged form of the insect, but even the young larval one, will ascend abundantly to the surface of the ground from shallow outlying rootlets, and will from thence progress slowly but surely over the surface to neighboring vines. Direct proofs of this fact have been had here within the last few weeks, and will be published in connection with other new observations, in a subsequent bulletin.

It follows that when such shallow rootlets are abundant (as they are in some soils), the obstacle or trap placed along the stock may affect the welfare and diffusion of the insect only in a slight degree. It is still true that even in this case, great numbers of the wanderers will perish without reaching the safe harbor of a root, since most of them will try the route along the stock and will there succumb to the mercurial trap. Still some will be likely to find their way down

to the superficial rootlets, as the multitude found its way *up* from them; and this will be the more surely the case, the more the soil is liable to be summer-cracked, or or the coarser its tilth. In close sandy, and in well-tilled soils, on the contrary, the chances of stray insects descending by chance to such rootlets would be exceedingly slight, in case the stocks were all protected by the mercurialized earth. How great is the difficulty interposed to the progress of the insect on a sandy surface, can only be appreciated by those who have watched the ludicrous antics it exhibits under such circumstances. The incessant tumbings and backslidings soon exhaust its energies, and show good reason why, notoriously, the phylloxera is comparatively harmless in very sandy, and correlatively in very well-tilled soils.

From the foregoing considerations, those interested may readily infer how far in their particular cases the ingenious device invented by Mr. Bauer is likely to prove efficacious; and while still it will undoubtedly be far better to plant resistant stock and graft, those favorably situated, or those who have already planted the non-resistant vine, will do well to take the proposed remedy under careful consideration.

Examination of soil from San Diego peninsula, San Diego county.—This soil, samples of which were furnished by Mr. Chas. Wetmore, represents the wider and more northerly portion of the low, sandy peninsula which separates San Diego bay from the ocean. It is covered with thick, low brush, of a kind not specified, and has not until lately been brought into cultivation. The surface soil is very finely sandy, of tawny tint, becoming more decidedly yellowish as the depth increases, and fairly yellow and somewhat more coarsely sandy at four feet depth. When wetted it becomes but very slightly coherent, and on drying falls apart by its own weight. The vigorous growth of chaparral upon it, however, suggests that it must have some substance, and this is confirmed by the following analyses of samples representing a tract of about 2,500 acres.

SOIL FROM SAN DIEGO PENINSULA.

| | SOIL, 12 INS. | SUBSOIL, 4 FT. |
|-----------------------------------|---------------|----------------|
| | No. 795. | No. 796. |
| Insoluble Residue..... | 88.898 | 90.462 |
| Soluble Silica..... | 2.432 | 2.438 |
| Potash..... | .304 | .257 |
| Soda..... | .117 | .194 |
| Lime..... | .509 | .370 |
| Magnesia..... | .377 | .317 |
| Br. Oxide of Manganese..... | .047 | .054 |
| Peroxide of Iron..... | 1.975 | 1.916 |
| Alumina..... | 3.555 | 3.790 |
| Phosphoric Acid..... | .097 | .061 |
| Sulphuric Acid..... | .005 | .033 |
| Organic Matter and Water... 1.597 | | 1.173 |
| Total..... | 99.913 | 100.065 |
| Gyrosopic Moisture..... | 1.50 | 3.69 |
| Absorbed at..... 12° C | | |

It is needless to say that soils containing from 91 to 93 per cent of sand cannot contain high percentages of plant food, as compared with loam or clay soils. But the extreme penetrability of such soils by the roots renders what plant food they do contain extremely available, and as a matter of fact, when of considerable depth, such soils are often both productive and durable.

In the present case the plant food percentages are no smaller than are found in many of the soils of the southeastern States that are profitably cultivated in cotton, although of much less depth. Compared with these the supply of potash in the San Diego soil is fair, and the soda representing possibly injurious sea salts, is but sparingly present. The lime supply for so sandy a soil is very large, and speaks of the high availability of the plant food present. The supply of phosphoric acid in the surface soil is large for such a soil, and not deficient even in the sandy subsoil. The whole compares favorably with those soils of the Gulf coast, on which sea island cotton has been successfully grown for years, and which are equally or even more sandy. It is therefore certain to be found productive. Among fruits, the olive would probably be best adapted to the situation.

E. W. HILGARD

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